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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MAI, NGOCLAN THI

ART UNIT

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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/563,982	Applicant(s) SCHOLL ET AL.	
	Examiner NGOCLAN T. MAI	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-19 is/are pending in the application.
- 4a) Of the above claim(s) 15-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-11, 13 and 14 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's election with traverse of Group I, claims 1-14 in the reply filed on April 6, 2010 is acknowledged. The traversal is on the ground(s) that the search and examination of an entire application can be made without serious burden, and that the claims of the invention would appear to be part of an overlapping search area. This is not found persuasive because although there may be some overlap in the searches of the two groups, there is no reason to believe that the searches would be identical. Furthermore, the examination of the process claims is based on a different criteria from that of the product claims, hence the examination of the two groups is not co-extensive. Therefore, based on the additional work involved in searching and examination of the two distinct inventions together that would present serious burden to the examiner, restriction of distinct invention is clearly proper.

As for the argument that the claims were not restricted out during the PCT proceeding for a lack of unity. This is not convincing since the restriction is base on US rule.

The requirement is still deemed proper and is therefore made FINAL.

Status of Claims

Claims 1, 3-14 are currently under examination, wherein claims 1 is currently amended in applicant's amendment filed on April 6, 2010. Previous claim 2 had been cancelled. Claims 15-19 have been withdrawn from consideration as being drawn to non-elected invention.

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Claim Objections

Claims 1 and 4 are objected to because of the following informalities: in claim 1, “deagglomeration” should be “deagglomeration” and in claim 4, the listing of metal elements in A, B and C are incorrect. See previous amendment.

Appropriate correction is required.

Status of Previous Rejection

The previous rejection to claims 1, 3, 6-11 as under 35 U.S.C. 102(b) as being anticipated by Kemp, Jr. et al (U.S. Patent No. 4,884,754) is withdrawn in light of applicant's amendment filed April 6, 2010.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, and 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kemp, Jr. et al (U.S. Patent No. 4,884,754 herein after referred to as Kemp '754) in view of Hampden-Smith.

Concerning claims 1 and 6, Kemp'754 discloses a process for producing fine powder flakes comprising milling copper powder particles in the presence of organic surfactant in a non

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polar organic medium to comminute the copper powder and produce intermediate flakes having thickness of less than about 3 μm , removing the major portion of the organic medium and organic surfactants from the intermediate flakes and fluid energy milling the intermediate flakes to reduce the diameter of the dried intermediate flakes and produce flakes having a diameter of no greater than 10 μm . See abstract and claim 1. Kemp'754 teaches (column 2, lines 35-39) the starting copper powders can be of any size, for example, less than 1000 μm in diameter and most typically less than about 250 μm . Copper powders having such particle sizes encompass the claimed starting powder having mean particle diameter D50 of greater than 25 μm . Note that the milling of copper powder to form flakes and the fluid energy milling read on the claimed deformation step and comminution step. Also note the ratio of particle diameter to particle thickness (aspect ratio) would encompass the claimed aspect ratio given the employment of starting particle diameter and particle thickness desired by Kemp'754.

Kemp '754 differs from the claims in that Kemp'754 does not expressly teach subjecting the Cu flakes to a deagglomeration step. However, Kemp'754 teaches the copper flake powder is suitable for use in fabricating thick film electronic circuit board. See column 1, lines 24-27 and column 3, lines 27-32. Hampden-Smith et al. discloses for making thick film paste, metal conductive powder are substantially non-agglomerate. See (U.S. Patent No. 6,689,186, column 37, lines 55-57). Therefore to further subject the comminuted copper flake powders of Kemp'754 to a deagglomeration step in order to deagglomerate the agglomerated powders (if present in the powder product) to provide non-agglomerated powder suitable for making thick film paste would have been obvious to one skilled in the art.

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Concerning claim 3, copper is the powder being produced which meets the claimed formula where copper is C, j is 100 % by weight and h, i and k are all zero.

Concerning claim 7, Kemp teaches using gas atomized copper powder which is well known in the art has spherical shape. See 2005/0182161 [0004] for such fact.

As for claim 8, Kemp teaches (column 2, lines 40-46) attritor mill is used for deforming the powder particles into flake.

Concerning claims 9, 10 and 11, Kemp discloses the intermediate flakes, introduced into a fluid energy mill using high velocity jets of either fluid or gas, impact against either a solid substrate or each other at a sufficient force to shatter or break the particles into smaller fragments. See column 3, lines 4-24. The copper flake serves as the grinding aid and is formed in-situ.

Claims 1 and 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kemp, Jr. et al. (U.S. Patent No. 4,787,561, hereinafter referred to as Kemp'561) in view of Srinivansan U.S. Patent No. 6,892,954).

Kemp'561 discloses a process for making fine granular metallic powder particles wherein the method comprises grinding the starting powder with a grinding media placed in a mill so that the media are in close proximity to one another to produce a densely packed state. Kemp'561 discloses (column 2, lines 1-5) powder produced having substantially smooth surfaces and an aspect ratio (particle length to particle thickness) from greater than 1 to about 100 and a mean particle size of less than 20 μm diameter. Kemp'561 also discloses (column 4, lines 28-29)

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starting feed material is a -200 mesh ($>75\ \mu\text{m}$) gas atomized 316 l stainless steel. Kemp'561 teaches at the start of the grinding operation a relatively higher speed is used to convert the starting material to flakes and the mill speed is then decreased so as to produce starting material powder having granular morphology. See column 3, lines 10-13. Kemp'561 discloses (column 3, lines 16-21) the combination of high packing of the grinding media and relatively low agitator speed leads to the particle size reduction through a combination of hear and true attrition (wear particle generation) of the particles and produces fine particles having a granular morphology. Kemp'561 therefore discloses a claimed step a), b) and c).

Kemp'561 differs from the claims in that Kemp'561 does not expressly teach metal powder having aspect ratio (particle diameter to particle thickness) of 10:1 to 10,000:1 and a deagglomeration step.

Concerning the aspect ratio, the examiner finds that the metal powder aspect ratio taught by Kemp'561 (1:0 to 100:1) overlaps the range as claimed by the applicant (10:1 to 100:1) establishing a prima facie case of obviousness in regard to this limitation.

Regarding the deagglomeration step, it would have been obvious to subject the comminuted stainless steel flake powder of Kemp'561 to deagglomeration for the reason as follow. Kemp'561 teaches the metallic powders can be used as feeds to a plasma jet. See column 1, lines 25-28. Srinivansan teaches non-agglomerated powder is a suitable feed stock for hot spraying process. Therefore it would have been obvious to one skill in the art at the time the invention was made to further subject the comminuted stainless steel flake powder of Kemp'561 to deagglomeration step in order to deagglomerate the agglomerated powder (if

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present in the powder product) to provide non-agglomerated powder suitable for plasma jet (i.e., hot spraying).

Regarding claims 3, 4 and 5, 316 L stainless is known to have composition comprising 16-18 % Cr, 10-14% Ni, 2-3% Mo, $\leq 0.1\%$ N, $\leq 0.03\%$ C, $\leq 2\%$ Mn, $\leq 0.045\%$ P, $\leq 0.03\%$ S and $\leq 0.75\%$ Si and Fe balance. The 316 L stainless steel powder product therefore meets the claimed composition with j and k being zero.

Regarding claim 6, the powder product has average particle diameter of about 11 μm . See column 4, line 25.

Concerning claim 7, Kemp'561 teaches the feed material can be coarse gas or water atomized prealloy powder. See column 4, lines 14-15. Kemp'561 therefore implicitly discloses employing feed material having spherical or irregular shape because it is known in the art that gas atomized powders have spherical shape and water atomized metal powders generally have irregular shape.

As for claim 8, Kemp'561 discloses (column 3, lines 1-3) attritor mill is used for grinding the powder particles into flakes.

Concerning claims 9 and 10 Kemp'561 discloses employing n-hexane and WC balls as grinding aid.

Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kemp'754 and Hampden-Smith or Kemp'561 and Srinivasan as applied to claim 1 above, and further in view of Cohen et al. and Saito et al.

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Kemp'754 in view of Hampden-Smith or Kemp'561 in view of Srinivasan do not teach subjecting the comminuted Cu flake to an deagglomeration step employing apparatus as recited in claim 13 and carry out the deagglomeration step in liquids, dispersing aids and binders as recited claim 14.

It is known in the art to carry out deagglomeration step by subjecting metal suspended in organic solvent to ultrasound in order to deagglomerate the agglomerated powder. See Cohen et al, column 3, lines 17-19 and column 3, line 66 to column 4, line 2.

It is also known to carry out deagglomeration step by kneading the powder in solvent. See Saito et al, column 4, lines 4-28.

Therefore to carry out the deagglomeration step taught by Kemp'754 in view of Hampden-Smith or Kemp'561 in view of Srinivasan by employing the known method taught by Cohen et al or Saito et al. would have been obvious to one skilled in the art. It would also have been obvious use apparatus and media used in the apparatus taught by Cohen et al or Saito et al for such purpose because one skill in the art could have combined the apparatus as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skilled in the art at the time of the invention.

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

The incorporation of The rejection of claims 1, 3, 6-11 under 35 U.S.C. 102(b) as being anticipated by Kemp, Jr. et al (U.S. Patent No. 4,884,754) is withdrawn in light of applicant's

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amendment by incorporate the indicated allowable subject matter of claim 2 in previous office action to claim 1.

However, upon further consideration, a new ground(s) of rejection is made in view of Kemp, Jr, et als in view of Hampden-Smith and Srinivasan. See above rejections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NGOCLAN T. MAI whose telephone number is (571)272-1246. The examiner can normally be reached on 8:30-5:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Roy King/
Supervisory Patent Examiner, Art Unit
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n.m.